Claims

We claim:

1. A ceramic composite electrolytic device for generating electrical power comprising:

a plurality of electrically connected solid state electrolytic electrical power generating cells, each of said cells including a ceramic composite body with first and second electrically conductive porous gas permeable electrode layers on opposite surfaces of said ceramic composite body, said first layer forming an anode and said second layer forming a cathode, and a bipolar metal member for engagement with said ceramic composite body of said cell on one side, and with said ceramic composite body of another adjacent cell on the other side,

said ceramic composite body further comprising a metal member having a regular pattern of openings formed within a center portion of the metal member for supporting a ceramic material and such pattern and openings have no sharp corners,

said bipolar metal member and said metal member of said ceramic composite body interconnected at a gas tight seal surrounding said ceramic material to form a fuel chamber, and together forming an output for removing exhaust generated in said fuel chamber of said cell,

said device further including a heat unit for heating said plurality of cells to a desired reaction temperature, a power connection connecting the output of said cell, a fan for supplying air to said cathode of said cell, and a fuel supplied to said plurality of cells for reacting with said plurality of interconnected cells to generate electrical power within said fuel chamber.

2. The device of claim 1 wherein a thermal shell having first, second and third concurrent metal layers in part surrounding said ceramic composite cells which are

stacked in electrical series and gas parallel surrounded by shock absorbing and insulating materials.

3. The device of claim 1, wherein the pattern of openings formed within said center portion of said metal member for supporting said ceramic material is a hexagonal close packed hole pattern.

4. A method for manufacturing a ceramic composite electrical power generating cell comprising the steps of:

providing a layer of ceramic material such as stabilized zirconia to a metal member having a pattern of openings with no sharp corners within a center portion of the metal member for intersupporting the ceramic material,

firing said metal member supporting the ceramic material to create a ceramic composite member;

coating said center portion of said metal member forming said ceramic composite member with an electrically conductive material;

firing said electrically conductive material with said metal member forming said ceramic composite member;

welding said metal member surrounding said ceramic composite member with a bipolar metal member having contact portions extending outwardly in two directions from a plane of the bipolar metal member for engagement with said ceramic composite member;

forming an air tight chamber between said ceramic composite member and said bipolar metal member for generating electrical power.

5. The method of claim 3, wherein the step of providing the layer of ceramic material to the hole pattern of the metal member comprises dipping.